SECTION C - STATEMENT OF WORK/SPECIFICATIONS

SUBSECTION C.1 - GENERAL REQUIREMENTS

C.1.1. THE REQUIREMENT

The work to be performed under this solicitation includes surface preparation and painting of damaged surface areas on the interior of the Lower Arizona Penstock. The work shall be in accordance with these contract provisions and clauses, these specifications, and the drawings listed in Paragraph C.8.2. (LIST OF DRAWINGS) hereof, Repair of Painted Surfaces, Lower Arizona Penstock, Hoover Dam, Boulder Canyon Project, Arizona-Nevada.

The work is located at Hoover Dam, on the Colorado River, approximately 8 miles northeast of Boulder City, Nevada, and 32 miles from Las Vegas, Nevada, in Clark County, Nevada and Mohave County, Arizona.

C.1.2. DESCRIPTION OF THE WORK

The principal components of the work on to be performed include the following:

a. Design and fabricate movable scaffolding systems to allow access to all areas within the horizontal penstock section. This includes:

1) Approximately 1025 linear feet (l.f.) of 30-foot diameter penstock section.

2) Approximately 615 l.f. of 25-foot diameter penstock section.

3) Approximately 1300 l.f. of 13-foot diameter penstock laterals (4 separate laterals).

b. Surface preparation and painting of damaged areas on the interior surface of the penstock. The majority of the damaged areas are small in size (1 to 10 square feet) and would be viewed as isolated spot repair. There are areas of damage that are much larger in size (10 to 30 square feet) at the turnouts of the laterals.

This includes the following:

1) Approximately 2000 square feet in the 30- and 25-foot diameter sections of the penstock (horizontal portion).

2) Approximately 500 square feet in the 13-foot diameter section of the penstock laterals (horizontal portion).

Unwatering, cleanup, and inspection of the penstock will be performed by the Government, beginning on or around October 1, 1999. Marking of damaged areas will be performed by the Contracting Officer Representative using the Contractor's scaffold. Access to the interior of the penstock by the Contractor is scheduled for October 18, 1999 and is dependent on final acceptance of a Safety Plan submittal and various Performance Criteria submittals.

C.1.3. PERIOD OF TIME FOR COMPLETION OF WORK IN THE PENSTOCK

Unwatering, cleanup, inspection, and marking of the damaged areas within the penstock will be performed by the Government, beginning on October 1, 1999. Access to the interior of the penstock by the Contractor is scheduled for October 11, 1999 and is dependent on final acceptance of a Safety Plan submittal and various Performance Criteria submittals. Marking of the damaged areas in the upper sections of the penstock shall be performed by the Government after installation of scaffolding by the Contractor.

The Contractor shall complete all work in the penstock by December 5, 1999 including removal of all material and equipment from the penstock and cleanup of the penstock. The Contractor shall remove all material and equipment from the job-site not later than the required contract completion date of December 17, 1999 (See Contract Clause F.2, 52.211-10, Commencement, Prosecution, and Completion of Work). The period of time for the contractor to complete work in the penstock (October 11, 1999 through December 5, 1999) is a "fixed window" and shall not be changed or extended.

C.1.4. SUBMITTAL REQUIREMENTS

a. General.--The Contractor shall furnish all materials and perform all work required for furnishing submittals to the Government, in accordance with this paragraph, Table 1A (List of Submittals), and the requirements in the provisions, clauses, and paragraphs of this contract.

The word "submittals" shall be interpreted to include drawings, data, manuals, certifications, test reports, curves, samples, color chips or charts, brochures, and other items furnished by the Contractor for approval, informational, or other purposes.

b. List of submittals.--Table 1A (List of Submittals) lists the submittals required by this contract except those submittals which are required conditionally, required by entities other than the Bureau of Reclamation, or which are periodic in nature. Any submittal required to be submitted by the Contractor, but which is not listed in the table, shall be submitted in accordance with the applicable requirements of this contract. In case of a conflict between the requirements of this paragraph and the requirements included elsewhere in this contract, the requirements elsewhere shall take precedence over the requirements contained in this paragraph.

c. Submittals.--Each item in Table 1A (List of Submittals) has been assigned an RSN (Required Submittal Number). The "Submittals required" column of the table specifies the material to be submitted for each RSN. All of the material specified for an RSN will be considered a complete set; and where the material required for an RSN is specified as separate or distinguishable parts, a complete set shall include all parts. Only complete sets shall be submitted.

The number of complete sets to be submitted, and the location to which they are to be sent, shall be in accordance with the "No. of sets to be sent to:" column of the table, except as provided below for sets of original material.

When an RSN involves submittal of original (non-copied) material, all original material, or as much thereof as is necessary to form a complete set, shall be included in just one complete set. This "originals" set shall be sent to the proper address, given in subparagraph e. below, as determined by the "Responsible code" column of the table and the following:

(1) CO indicates Contracting Officer.

(2) CE indicates Construction Engineer.

The "originals" set shall be counted as one of the complete sets required to be submitted under the "No. of sets to be sent to:" column of the table.

For each RSN, the Contractor shall submit complete sets of required submittal material under the cover of a transmittal letter. At the Contractor's option, complete sets for more than one RSN may be submitted under cover of the same transmittal letter, provided they have the same responsible code designation as shown in the table. The Contractor's transmittal letter shall include:

(1) Reference to Bureau of Reclamation contract number and title.

(2) Identification of responsible code as shown in the table.

(3) Complete list of RSN(s) for which material is being submitted.

(4) For each RSN, number of complete sets and list of materials included.

(5) For each RSN, identification of the submittal as an initial submittal or a resubmittal.

Each drawing submitted by the Contractor shall have the Contractor's or supplier's title and drawing number on it. Drawings and data shall be labeled with the Bureau of Reclamation contract number and the bidding schedule item number.

Manufacturer's data for commercial products or equipment, such as catalog cut sheets, shall be clearly marked to indicate the item(s) to be furnished. The data shall be sufficiently comprehensive to identify the manufacturer's name, type, model, size, and characteristics of the product or equipment, as well as to fully demonstrate that the product or equipment meets the requirements of these specifications.

Submittals requiring certification by a registered professional shall be signed and sealed.

d. Review of submittals furnished for approval.--The time required for review of each submittal or resubmittal furnished under an RSN for approval will not begin until the Government receives complete sets of all the submittal materials required for that particular RSN. The number of calendar days required for review of drawings or data submitted or resubmitted for approval will include the date the drawings or data are received by the Government, and will extend through the date of return mailing to the Contractor.

Except as otherwise provided in the specifications for specific submittals, the Government will require 20 calendar days for review of each submittal or resubmittal furnished by the Contractor for approval, and this review time will apply to each separate submittal or resubmittal whether the submittals are approved, not approved, or returned for revision.

If the Government uses time in excess of the specified number of calendar days for review of any submittal or resubmittal, additional time, not to exceed the excess time, will be added to the time allowed the Contractor for delivery of the materials or equipment affected by such excess time, to the extent it is demonstrated that the excess time caused delay. If the Government's review of two or more separate submittals or resubmittals is late and results in concurrent days of excess time, such days will be counted only once in computing an extension of the delivery date. Further, if the Contractor fails to make complete approval submittals in the sequence and within the time periods specified in this contract, and thus precludes the Government from approving or considering for approval such submittals within the specified calendar day period, then the Contractor shall not be entitled to an extension of time allowed for delivery of the materials or equipment.

Unless otherwise specified, one set of the submittals required for approval will be returned to the Contractor either approved, not approved, or conditionally approved, and will be marked to indicate changes, if required. Submittals that are not approved or that require changes or revisions shall be revised and resubmitted for approval, and shall show changes and revisions with revision date. All requirements specified for the initial submittal shall apply to any resubmittals required. Unless otherwise specified, all submittals which are to be resubmitted shall be resubmitted by the Contractor within 20 calendar days after the Contractor has received the Government's comments.

e. Addresses.--The Contractor shall send the submittals to the applicable addresses listed below as required by Table 1A (List of Submittals).

The Contractor shall also send a copy of the transmittal letter to each of the addresses listed below that are not sent the submittal.

Submittals shall be sent as required by Table 1A (List of Submittals) to:

(1) Contracting Officer, Attn: LC-3110
Bureau of Reclamation
Lower Colorado Regional Office
P.O. Box 61470
Boulder City NV 89006-1470

(2) Bureau of Reclamation
Lower Colorado Dams Facilities Office
Construction Engineer, Attn: LCD-2000
P.O. Box 60400
Boulder City NV 89006-0400

f. Cost.--Unless otherwise specified, no separate payment will be made for preparing and furnishing submittals to the Government, and the cost thereof shall be included in the prices bid in the schedules for the applicable items of work requiring the submittals or other items of work.

Table 1A--List of Submittals

RSN	Item	Reference provision, clause, or paragraph	Respon-sible code	Submittals required	No. of sets to be sent to:*		Due date or delivery time
					CO	CE	
001	Hazardous Materials.	C.4.1.	CE	Material Safety Data Sheets and updated List of Hazardous Materials.	1	2	Not less than 30 days prior to jobsite delivery of each hazardous material.
002	Air Abatement.	C.5.2.	CE	Air Quality Permits.	1	1	Submitted and accepted before commencing onsite work.
003	Scaffolding	C.6.1.h.	CE	Drawings, pamphlets, manufacturer’s literature, and general information about the scaffolding or work platforms.	1	2	Submitted and accepted before commencing onsite work.
004	Paint and coating materials.	C.7.1.	CE	Purchase orders, certifications, and paint manufacturer's composition data.	0	3	No later than 30 days after the date of the executed contract.
005	Warranties of workmanship, paint and coating materials.	C.7.1.a.	CO	Standard Warranties.	1	2	Prior to submission of final invoice.
006	SSPC QP1 Certification	C.7.1.b.2.	CE	Written evidence of SSPC QP1 Certification.	1	2	No later than 30 days after contract award.
007	Liability Insurance	I.7	CO	Acceptable evidence showing that insurance has been obtained.	1	0	Prior to commencement of work under this contract.
008	Insurance - work on a Government installation	52.228-5	CO	Written certification that the required insurance has been obtained.	1	0	Prior to commencement of work under this contract.

RSN	Item	Reference provision, clause, or paragraph	Respon-sible code	Submittals required	No. of sets to be sent to:*		Due date or delivery time
					CO	CE	
009	Safety and Health	WBR 1452.223-81	CE	Safety Program.	0	2	Submitted and accepted before commencing onsite work.
010	Performance and Payment Bonds	52.228-15	CO	Bonds	1	0	Within 15 days after award.
011	Release of Claims	DOI 1452.204-70	CO	Release of Claims (DI-137) against the United States	1	1	After completion of the work and prior to final payment.
012	Equal Opportunity	52.222-26	CO	Information required by Executive Order 11246 (SF-100)	1	0	Within 30 days after award of contract.
013	Payment Information (Electronic Funds Transfer)	52.232-33	CO	Payment Information	1	0	14 days prior to first payment.

* CO indicates Contracting Officer and CE indicates Construction Engineer. For mailing addresses, see subparagraph entitled "Addresses" of paragraph entitled "Submittal Requirements."

SUBSECTION C.2 - MATERIALS

C.2.1. MATERIALS TO BE FURNISHED BY THE CONTRACTOR

a. General.--The Contractor shall furnish all materials required for completion of the work.

The words "material" or "materials" as used in these specifications to denote items furnished by the Contractor shall be construed to mean equipment, machinery, product, component, or any other item required to be incorporated in the work.

When a separate item which includes the furnishing of any material is provided in the schedule, the cost of furnishing, hauling, storing, and handling shall be included in the price bid for that item. When a separate item is not provided in the schedule for furnishing any material required to be furnished by the Contractor, the cost of furnishing, hauling, storing, and handling shall be included in the price bid for the work for which the material is required.

Materials furnished by the Contractor shall be of the type and quality described in these specifications. The Contractor shall make diligent effort to procure the specified materials from any and all sources, but where because of Government priorities or other causes, materials required by these specifications become unavailable, substitute materials may be used: Provided, That no substitute materials shall be used without prior written approval of the Contracting Officer, said written approval to state the amount of the adjustment, if any, to be made in favor of the Government. The Contracting Officer's determination as to whether substitution shall be permitted and as to what substitute materials may be used shall be final and conclusive. If the substitute materials approved are of less value to the Government or involve less cost to the Contractor than the materials specified, an adjustment shall be made in favor of the Government, and where the amount involved or the importance of the substitution warrants, a deductive modification to the contract will be issued. No payments in excess of prices bid in the schedule will be made because of substitution of one material for another or because of the use of one alternate material in place of another.

b. Inspection of materials.--Materials furnished by the Contractor which will become a part of the completed service work shall be subject to inspection at any one or more of the following locations, as determined by the Contracting Officer: at the place of production or manufacture, at the shipping point, or at the site of the work. To allow sufficient time to provide for inspection, the Contractor shall submit to the Contracting Officer, at the time of issuance, one copy of the purchase order, including drawings and other pertinent information, covering materials on which inspection will be made as advised by the Contracting Officer, or shall submit other evidence in the event such purchase orders are issued verbally or by letter.

The inspection of materials at any of the locations specified above or the waiving of the inspection thereof shall not be construed as being conclusive as to whether the materials and equipment

conform to the contract requirements, nor shall the Contractor be relieved thereby of the responsibility for furnishing materials meeting the requirements of these specifications. Acceptance of all materials will be made only at the site of the work.

C.2.2. MATERIALS AND WORKMANSHIP--(RECLAMATION)

a. Materials.--All materials furnished by the Contractor shall be new and of the most suitable grade for the purpose intended considering strength, ductility, durability, and best engineering practice.

Materials shall conform to Federal specifications or standards; or to specifications or standards of ANSI (American National Standards Institute), ASTM (American Society for Testing and Materials), ASME (American Society of Mechanical Engineers), SAE (Society of Automotive Engineers), IEEE (Institute of Electrical and Electronic Engineers), NFPA (National Fire Protection Association), or other nationally recognized standards organization. If the Contractor proposes to deviate from, or to use materials not covered by, the aforementioned specifications and standards, the Contractor shall submit, for approval, the justification for and exact nature of the deviation, and complete specifications for the materials proposed for use.

b. Workmanship.--The Contractor shall be responsible for the accurate manufacture and fabrication of materials in accordance with best modern practice and the requirements of these specifications, notwithstanding minor errors or omissions therein.

Liberal factors of safety and adequate shock-absorbing features shall be used throughout designs, especially for parts subjected to variable stress or shock, including alternating or vibrating stress or shock. Shock-absorbing features and parts subject to vibration shall include provisions which prevent components from loosening.

C.2.3. REFERENCE SPECIFICATIONS AND STANDARDS

Materials, Contractor design, construction work, and other requirements which are specified by reference to Federal Specifications, Federal Standards, or other standard specifications or codes shall be in compliance with the editions or revisions included in these specifications. In the event of conflicting requirements between a referenced specification, standard, or code and these specifications, these specifications shall govern.

Unless otherwise specified, all materials that will become a part of the completed work shall be new and shall conform to the Federal or other specifications and standards referred to herein. Where reference specifications numbers are designated throughout these specifications, they refer to Federal Specifications unless otherwise noted. In the event that the materials are not covered by Federal or other specifications, the materials furnished shall be of standard commercial quality.

Where types, grades, or other options offered in the reference specifications are not specified in these specifications, the material furnished will be acceptable if it is in accordance with any one of the types, grades, or options offered.

Copies of many of the Federal Specifications and Standards may be examined at the office of the Bureau of Reclamation, Building 67, West 6th Avenue and Kipling Street, Denver, Colorado. Single copies of Federal Specifications and standards may be obtained without charge from any one of the General Services Administration Business Service Centers. See the provision at FAR 52.211-1, "Availability of Specifications Listed in the GSA Index of Federal Specifications, Standards and Commercial Item Descriptions."

Bureau of Reclamation Standard Material Specifications and Methods of Tests (The M-series documents) may be obtained from the Bureau of Reclamation, Attn: D-8170, P.O. Box 25007, Denver CO 80225-0007.

Other Reclamation publications including manuals and Reclamation's significant scientific, technical, and engineering works are available from the National Technical Information Service (NTIS). Information regarding availability and pricing may be obtained by contacting NTIS at the following address:

United States Department of Commerce
National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22161

Telephone: 1-703-487-4650 or 1-800-553-6847

These addresses may also be used to order the various manuals and standard specifications printed, reprinted, or published while the Bureau of Reclamation was officially named the Water and Power Resources Service. All references to Water and Power Resources Service or any form derivative thereof shall be considered synonymous with the Bureau of Reclamation.

Addresses for obtaining some industrial and governmental (other than Federal and Bureau of Reclamation specifications and standards) specifications, standards, and codes are listed in the provision at FAR 52.211-3, "Availability of Specifications Not Listed in the GSA Index of Federal Specifications, Standards and Commercial Item Descriptions."

The Contractor shall maintain onsite, a copy of all specifications, standards, codes, manuals, and other documents that are referenced in these specifications and that are pertinent to the materials being installed or work proceeding at that time. These shall be available for use by the Contracting Officer and the Contracting Officer's representatives.

SUBSECTION C.3 - LOCAL CONDITIONS

C.3.1. ACCESS TO THE WORK AND HAUL ROUTES

a. General.--The Contractor shall make its own investigation of the condition of available public or private roads and of clearances, restrictions, bridge-load limits, bond requirements, and other limitations that affect or may affect transportation and ingress and egress at the jobsites. Subject to the clause entitled "Default (Fixed-Price Construction)," the unavailability of transportation facilities or limitations thereon shall not become a basis for claims for damages or extension of time for completion of work.

b. Existing roads.--Existing roads are available for the Contractor's use subject to existing restrictions. The Contractor shall meet all conditions properly imposed upon the use of existing roads by those having jurisdiction thereover, including seasonal or other limitations or restrictions.

c. Haul routes.--The hauling of construction materials or waste materials over public highways, roads, or bridges shall be in compliance with the applicable local regulations and shall be such as to minimize interference with or congestion of local traffic.

d. Parking.--Parking is extremely limited in the construction area, and the Contractor may be restricted as to the number and the type of vehicles that may be parked there. The Contractor shall use parking areas adjacent to the construction site as approved by the Contracting Officer, and shall not block traffic with parked vehicles, equipment, and/or materials. Additional area for the Contractor's employee parking will be provided at an area near the Government warehouse on U.S. Highway 93.

The Contractor shall place an identification label, with the Contractor's name, on the windshield of vehicles parked at the construction area. This will not be required if the Contractor's name is prominently displayed at some other location on the vehicle.

e. Entry into penstock.--Access into the Lower Arizona Penstock is very limited. Entry and exit of all personnel and equipment is through one manhole, 26" by 36". There are other openings such as 12-inch drains and 16-inch by 20-inch manholes but these smaller openings would primarily be used for drain lines, power cables, compressed air lines, and as air vents. See Drawing No. 45-D-2173 for location of manholes and drains.

An additional option will be made available to the Contractor. At the farthest downstream end of the penstock is the tunnel plug manifold. This manifold divides into six separate discharge lines, each approximately 7 ft in diameter. Two of the discharge lines terminate with large bulkhead cover plates. Once the penstock has been dewatered, the Contractor may elect to remove the cover plates and gain access to much larger openings.

f. Cost.--The cost of all work described in this paragraph shall be included in the prices bid in the schedule for other items of work.

C.3.2. SECURITY AND IDENTIFICATION OF EMPLOYEES

The operation of Hoover Dam and Powerplant requires continuous and effective security measures. Such security is carried out by a Federal guard system, and the security regulations provide for controlled access to certain restricted areas including switchyards, powerplants, and other critical areas. These restricted areas are designated and may be modified or changed by the Contracting Officer. All necessary security measures required by this contract including provisions for security police and/or guards shall be subject to the approval by the Contracting Officer. The Contractor shall be responsible for initiating necessary measures to insure that its employees comply with all established security rules and regulations, including but not restricted to the following:

1) Construction work areas.--All areas where work is required under this contract are designated as construction work areas. The Contracting Officer will designate suitable accessways to construction work areas for use of construction personnel. Unless specifically authorized, construction personnel shall be restricted to these areas. It shall be the Contractor's responsibility to insure by appropriate and effective means that its personnel remain in these areas while on the jobsite.

2) Restricted areas.--Construction personnel will not be permitted to enter established or designated restricted areas unless so authorized by the Contracting Officer. Such entry shall be in accordance with and subject to the security regulations established in the area. It shall be the Contractor's responsibility to insure by appropriate and effective means that its personnel shall not enter these areas unless authorized as set forth above.

3) Identification of Contractor employees.--All Contractor personnel who will require access to secured areas of the Hoover Dam facilities shall be issued a numbered identification badge clearly identifying the employee and its employer. Such identification shall be required for all employees on the jobsite and shall be worn at all times. If special badges holding the employee's photograph are required for restricted areas, such badges will be furnished by the Government.

The cost of complying with this paragraph shall be included in the prices bid in the schedule for other items of work.

C.3.3. USE OF LAND FOR SERVICE PURPOSES

a. General.--The Contractor will be permitted to use Government land, controlled by the Bureau of Reclamation, for field offices, plants and buildings, storage yards, shops, and other service facilities required for service purposes.

b. Government land.--The Contractor's use of Government land for service purposes shall be subject to SUBSECTION C.5 (ENVIRONMENTAL QUALITY PROTECTION) of these specifications, and to the requirements of this paragraph. Such use shall not interfere with any part of the work under this contract, nor with the work of other contractors or the Government in the vicinity, nor with reservations made, or as may be made, by the Government for the use of such land.

c. Cost.--No charge will be made to the Contractor for the use of Government land for service purposes.

C.3.4. PROTECTION OF EXISTING INSTALLATIONS

a. General.--In performing work in the existing facility, the Contractor shall take all necessary precautions to safeguard existing installations.

The Contractor shall furnish, install, and maintain adequate protection as needed to safeguard personnel and existing facilities from harm due to its operations. Such protection shall be subject to approval by the Contracting Officer.

All protective installations shall be arranged so as to permit operation of the existing equipment and facilities by the Government while work under these specifications is in progress. The Contractor shall remove all protective installations provided by them after they have served its purpose. The materials furnished by the Contractor to provide protection shall remain the property of the Contractor and, after removal, shall be transported from the worksite.

Drawings included in these specifications show the items of existing materials and equipment but do not purport to show all equipment and materials existing at the worksite.

b. Enclosures.--Enclosures shall be constructed by the Contractor to prevent weld spatter, dust, spalls, chips, grit, and other foreign material from endangering personnel and contaminating or damaging equipment during service operations.

Enclosures shall be subject to approval of the Contracting Officer. Enclosures shall be sufficient to confine the Contractor's operations to the immediate work area, and to prevent contaminating and damaging mechanical and electrical installations.

c. Damages.--The Contractor shall repair, at its expense, any damage to the existing installations due to the Contractor's operation or its failure to provide proper protection; or at the option of the Contracting Officer, any such damage may be repaired by the Government and the Contractor will be backcharged for the cost thereof.

d. Cost.--The cost of protection of existing installations in accordance with this paragraph shall be included in the prices bid in the schedule for other items of work.

C.3.5. GOVERNMENT AND CONTRACTOR FURNISHED FACILITIES

The following Government facilities will be available to the Contractor at no charge for use in the performance of work under these specifications:

a. Water at approximately 80 pounds per square inch pressure.

b. Sanitary facilities.--Existing restrooms will be made available.

c. Electrical power.--Single phase, 60-hertz, alternating current at approximately 120/240 volts.

d. Compressed air.--Pressurized air lines at various locations within the penstock tunnel and access adit will be made available to the Contractor upon request.

The location of these facilities will be shown during the prebid site visit or after award of the contract. Facilities are provided on an as-is, where-found basis. The Contractor is responsible for being cognizant of the location of the utilities.

The Contractor shall provide all necessary distribution circuits, transformers, and other electrical equipment required for distributing the power to the place or places of use by the Contractor and shall dismantle and remove from the site of the work all such distribution circuits and equipment at the termination of the contract.

Likewise, the Contractor shall provide all means of conveying water and/or compressed air to points of use and shall remove from the site all Contractor equipment at the termination of the contract.

The cost of providing necessary materials and labor for conveying water and power to points of use shall be included in the prices bid in the schedule for other items of work.

SUBSECTION C.4 - SAFETY

C.4.1. SUBMISSION OF MATERIAL SAFETY DATA SHEETS FOR HAZARDOUS MATERIALS

The Contractor shall not require or permit any employee employed in the performance of the contract to engage in work under conditions which are unsanitary, hazardous, or dangerous to the employees health or safety and shall therefore comply with the Reclamation Safety and Health Standards. After award of contract, the Contractor shall submit updated List of Hazardous Materials (LHM) and Material Safety Data Sheets (MSDS) in accordance with the requirements of paragraph (e) of the clause at FAR 52.223-3, "Hazardous Materials Identification and Safety Data."

The Contractor shall submit the updated LHM and completed MSDS and identification and certification for each material to the Bureau of Reclamation, Lower Colorado Dams Facilities Office, Construction Engineer, Attn: LCD-2000, P.O. Box 60400, Boulder City NV 89006-0400. Copies of the updated LHM and completed MSDS shall be submitted in accordance with Paragraph C.1.4. (SUBMITTAL REQUIREMENTS). The Contractor shall not deliver any hazardous material to the jobsite which was not included on the original LHM prior to acceptance of the Contractor's MSDS by the Construction Engineer, Boulder City, Nevada.

The cost of complying with this paragraph shall be included in the applicable prices bid in the schedule for the items of work for which the hazardous materials are required.

SUBSECTION C.5 - ENVIRONMENTAL QUALITY PROTECTION

C.5.1. PREVENTION OF WATER POLLUTION

a. General.--The Contractor shall control pollutants by use of wastewater management controls, service site management practices, and other controls, including State and local control requirements.

(1) Service site management.--The Contractor shall perform service activities by methods that will prevent entrance, or accidental spillage, of solid matter, contaminants, debris, or other pollutants or wastes, into streams, flowing or dry watercourses, lakes, wetlands, reservoirs, or underground water sources. Such pollutants and wastes include, but are not restricted to: refuse, garbage, cement, sanitary waste, industrial waste, hazardous materials, radioactive substances, oil and other petroleum products, aggregate processing, tailings, mineral salts, and thermal pollution.

(2) Service safety standards.--The Contractor shall comply with the sanitation and potable water requirements of section 7 of Reclamation's publication "Reclamation Safety and Health Standards."

(3) Laws and regulations.--The Contractor shall perform service operations in such a manner as to comply, and ensure all subcontractors to comply, with all applicable Federal, state, and local laws, orders, regulations, and Water Quality Standards concerning the control and abatement of water pollution. In the event there is a conflict between Federal, state, and local laws, regulations, and requirements, the most stringent shall apply.

b. Cost.--The cost of complying with this paragraph shall be included in the prices bid in the schedule for other items of work.

C.5.2. ABATEMENT OF AIR POLLUTION

a. General.--The Contractor shall comply with applicable Federal, state, and local laws and regulations and with the requirements of this paragraph concerning the prevention and control of air pollution. Should a conflict exist in the requirements for abatement of air pollution, the most stringent requirement shall apply. The Contractor shall utilize such methods and devices as are reasonably available to prevent, control, and otherwise minimize atmospheric emissions or discharges of air contaminants.

Burning of combustible service materials and rubbish will not be permitted. In lieu of burning, such combustible materials shall be disposed of in accordance with Paragraph C.5.3. (CLEANUP AND DISPOSAL OF WASTE MATERIALS).

Storage and handling of flammable and combustible materials, provisions for fire prevention, and control of dust resulting from service operations shall be in accordance with the applicable provisions of Reclamation's publication "Reclamation Safety and Health Standards."

b. Submittals.--Submittals shall be in accordance with this paragraph and Paragraph C.1.4. (SUBMITTAL REQUIREMENTS).

Prior to commencing any activity for which an Air Quality Permit is required, the Contractor shall submit, for informational purposes, a copy of the applicable Air Quality Permit. Air Quality Permits are required for certain service-related activities including, but not limited to, earthmoving, sandblasting, aggregate processing, welding, spray-coating operations, or other processes which discharge pollutants into the open air.

Air Quality Permits, and information concerning the requirements, can be obtained from the appropriate state agencies.

c. Cost.--The cost of complying with this paragraph shall be included in the prices bid in the schedule for other items of work.

C.5.3. CLEANUP AND DISPOSAL OF WASTE MATERIALS

a. General.--The Contractor shall be responsible for the cleanup and disposal of waste materials and rubbish. Contractor removed piping and appurtenances to be disposed of shall be considered waste material. The disposal of waste materials and rubbish shall be in accordance with applicable Federal, state, and local laws and regulations, with applicable requirements of Reclamation's publication "Reclamation Safety and Health Standards," and with the requirements of this paragraph. Should a conflict exist in the requirements for cleanup and disposal of waste materials, the most stringent requirement shall apply.

The Contractor shall keep records of the types and amounts of waste materials produced, and of the disposal of all waste materials on or off the jobsite.

In the event of the Contractor's failure to perform the work required by this paragraph, the work may be performed by the Government, and the Contractor will be backcharged for the cost of such work. The Contractor's surety or sureties shall be liable for such payment until received by the Government.

b. Cleanup.--The Contractor shall keep work and storage areas free from accumulations of waste materials and rubbish, and before completing the work, shall remove all plant facilities, buildings, enclosures, including concrete footings and slabs, rubbish, unused materials, concrete forms, and other like materials, which are not a part of the permanent work.

In addition, the Contractor will be required to conduct an environmental site assessment at the following Contractor use locations:

(1) All hazardous waste accumulation areas.

(2) All hazardous material storage areas where the aggregate storage of hazardous materials at the site is or has been over 110 gallons.

This site assessment shall be performed by an industrial hygienist, an environmental specialist, or equivalent, and shall document through appropriate analytical sampling that the site is free of the effects of contamination (i.e., contaminant concentrations less than state action cleanup levels).

c. Disposal of hazardous waste and materials.--Materials or wastes, defined as hazardous by 40 CFR 261.3; Federal Standard 313 (1996), as amended; or by other Federal, state, or local laws or regulations, used by the Contractor or discovered in work or storage areas, shall be disposed of in accordance with these specifications and applicable Federal, state, and local laws and regulations. Unknown waste materials that may be hazardous shall be tested, and the test results shall be submitted to the Contracting Officer for review.

Waste materials known or found to be hazardous shall be disposed of in approved treatment or disposal facilities. Hazardous wastes shall be recycled whenever possible. A copy of all hazardous waste manifests shall be sent to the Contracting Officer.

Waste materials discovered at the service site shall immediately be reported to the Contracting Officer. If the waste may be hazardous, the Contracting Officer may order delays in the time of performance or changes in the work, or both. If such delays or changes are ordered, an equitable adjustment will be made in the contract in accordance with the applicable clauses of the contract.

d. Disposal of other nonhazardous waste materials.--

(1) General.--Waste materials including, but not restricted to, refuse, garbage, sanitary wastes, industrial wastes, and oil and other petroleum products, shall be disposed of by the Contractor. Disposal of combustible materials shall be by removal from the service area. Disposal of combustible materials by burning will not be permitted.

(2) Disposal by removal.--Waste materials to be disposed of by removal from the service area shall be removed prior to completion of the work under these specifications. All materials removed shall become the property of the Contractor.

Waste material shall be dumped only at an approved sanitary landfill. The Contractor shall make any necessary arrangements with private parties and county officials pertinent to

locations and regulations of such landfills, and shall pay any fees or charges required for such dumping.

e. Cost.--Except as provided above, the cost of cleanup and disposal of waste materials in accordance with this paragraph shall be included in the prices bid in the schedule for other items of work.

SUBSECTION C.6 - SCAFFOLDING

C.6.1. SCAFFOLDING REQUIREMENTS

a. General.--Scaffolds, ladders, stairways, ramps, platforms, or temporary floors shall be provided for employees engaged in work that cannot be performed safely from the ground or from solid construction.

Scaffolding shall be erected, dismantled, or altered under the supervision of a competent person and in compliance with the requirements of this section and ANSI A10.8-1988, "Construction and Demolition Operations - Scaffolding Safety Requirements," with the more stringent standards prevailing. Ladders or makeshift devices shall not be used to increase height of scaffolding. Scaffolding working surfaces shall be essentially level.

Scaffolds and their components shall be capable of supporting at least four times the maximum intended load. Scaffolds shall not be loaded in excess of the working load for which they are designed. Materials shall not be stored on scaffolds in excess of supplies needed for immediate operations. Manufactured scaffolds shall be used in accordance with manufacturer's recommendations.

Employees working on suspended or movable scaffolding or scaffolding without standard guardrails, shall be protected by nets, lifelines, lanyards, and belts as set forth in Reclamation’s publication entitled “Reclamation Safety and Health Standards.”

Work platforms and scaffolds more than 6 feet above the ground or floor level shall be provided with standard guardrails, midrails, and toeboards on the open sides and ends except for floats, needle beam, and ladder-supported scaffolds. Guardrails are not required during the erection and dismantling of scaffolds. However, fall protection meeting the requirements above shall be used.

The footing or anchorage for scaffolds shall be sound, rigid, and capable of carrying the maximum intended load without settling or displacement. Poles, legs, and uprights shall be plumb and securely and rigidly braced to prevent swaying and displacement.

Scaffolds shall not be altered or moved horizontally while being occupied except when specifically designed for such use. Freestanding scaffolds with a height to base ratio of more than 4 to 1 shall be guyed, braced, or otherwise restrained from tipping.

Scaffolding that utilizes structural members and/or working surfaces different from those specified herein and in referenced standards shall be designed by a competent registered engineer and accepted by the COR or office head prior to onsite erection.

Scaffolding or working platforms will be required to gain access to all portions of the penstock. This includes the main portion of the 30 foot diameter penstock, the 25 foot diameter section of the penstock (downstream end), and the 13 foot diameter penstock laterals (lines to the generators). The incline portion of the 30 foot diameter penstock and the tunnel plug manifold section shall be excluded from work under this contract.

b. Scaffolding load requirements.--Materials selected for scaffold working surfaces shall be designed to produce a platform that will safely support the specified load. The load rating for scaffold decking units shall be based on the greater of the person loading requirements or the uniformly distributed load requirement.

The width of all scaffolds, ramps, runways, and platforms shall be sufficient to prevent congestion of persons, materials, or equipment, and in no case shall they be less than 18 inches wide.

1) Person loading requirements.--The design working load for scaffold decking units shall be calculated on the basis of one or more 200 pound persons with 50 pounds of equipment each. Scaffold decking units designed for one person shall be designed and constructed to carry 250 pounds placed in the center of the span. Scaffold decking units designed to support two people shall be designed to carry 500 pounds with 250 pounds placed 18 inches each side of the center of the span. Scaffold decking units designed to support three people shall be designed to support 250 pounds in the center of the span and 250 pounds 18 inches each side of the span.

2) Uniformly distributed load requirements.--Each scaffold decking unit, where applicable, shall be designed to carry a uniformly distributed load as an alternate to the person loading requirement.

a)	Heavy duty	75 pounds per square foot
b)	Special duty	greater than 75 pounds per square foot

Wood scaffold planks shall be designed so that the deflection, at the center of the span at the design load does not exceed the span divided by 60. Permissible spans that comply with the above requirement are shown below:

One person	8 ft
Two people or heavy duty	7 ft
Three people or special duty	5 ft

c. Standard guardrails.--A standard guardrail shall consist of a toprail, intermediate rail, toeboard, and posts. The vertical height of the guardrail shall be 42 inches. Posts, toprails, and intermediate rails shall either be a minimum 1.5-inch diameter steel pipe or 2- by 2- 3/8-inch angle iron with posts spaced not to exceed 8 feet on centers. Wire rope or cable having equivalent strength of pipe guardrails may be used for top and intermediate rails provided deflection is less than 12 inches under a 200-pound loading at center span. Regardless of material used, the guardrail shall be capable of withstanding a minimum loading of 200 pounds supplied in any direction at any point on the toprail with a minimum of deflection. Railings required to withstand greater stress due to the nature of use shall be designed with a minimum safety factor of four.

d. Metal scaffolds and towers.-- All metal scaffolds and towers shall be listed by Underwriters Laboratories, Inc., or Factory Mutual Engineering. Such scaffolds and towers shall be erected in accordance with the manufacturer's specifications and the design load limits shall not be exceeded.

Sections of metal scaffolds shall be set plumb and securely connected together. All braces shall be installed prior to scaffold use. The entire scaffold shall be secured and braced to the building or structure at intervals not exceeding 30 feet horizontally and 26 feet vertically. Freestanding scaffold working platform heights shall not exceed three times the smallest base dimension.

e. Tube and coupler scaffolds.--Tube and coupler scaffolds shall be designed and constructed in accordance with industry standards and the requirements of this paragraph.

The components of tube and coupler scaffolds shall be constructed of steel tubing not less than the respective minimum diameters and spacing indicated in the following table:

Posts, runners, and bracing diameter	2-in o.d.
Bearer diameter	2.5-in o.d.
Maximum post spacing (length)	6.5 ft
Maximum post spacing (width)	6 ft

Bearers shall be at least 4 inches, but not more than 12 inches longer than the post or runner spacing. Bearers shall be installed transversely between posts and shall be securely coupled to the posts bearing on the runner coupler.

Diagonal bracing shall be installed across the scaffold at least every third set of posts horizontally and every fourth runner vertically. Longitudinal diagonal bracing shall be installed on the inner and outer rows of poles at an angle of 45 degrees from the base of the scaffold to the top. All diagonal bracing shall be attached to each pole that it crosses.

f. Tubular welded frame scaffolds.--Metal tubular frame scaffolds, including all load-bearing components, shall be designed and constructed to safely support four times the maximum rated load. The frames shall be placed one directly over the other using coupling or stacking pins to provide vertical alignment of the posts.

When uplift may occur, frame members shall be locked together vertically by pins or equivalent means.

Metal tubular frame scaffold shall be properly braced by cross bracing or diagonal braces, or both for securing vertical members together laterally, and the cross braces shall be of such length as will automatically square and aline vertical members. All brace connections shall be made secure.

g. Mobile scaffolds.--The height of free-standing mobile scaffolds shall not exceed four times the minimum base dimension.

Wheels and casters shall be equipped with a positive locking device to prevent accidental movement of the scaffold.

The force necessary to move mobile scaffolds shall be applied as close to the base of the scaffold as possible. Provisions shall be made to stabilize the scaffold during movement. The scaffolds shall be used only on firm, level, and broom-clean surfaces.

No persons shall be permitted to ride on a manually propelled mobile scaffold unless the following conditions exist:

1) The floor or surface is within 1.5 degrees of level and free of pits, holes, or obstructions.

2) The minimum dimensions of the scaffold base when ready to move is at least one-half the height.

3) Outriggers, if used, shall be installed on both sides of staging.

4) The wheels or coasters are equipped with rubber or similar resilient tires.

5) Tools and materials are removed from the platform or secured prior to movement.

h. Submittals.--The Contractor shall submit drawings, pamphlets, manufacturer's literature, and general information about the scaffolding or work platforms that will be used in the penstock. Separate submittals shall be required or each size and type of scaffolding that is to be used. The submittals must include design load calculations that meet the requirements of subparagraph b. above.

Safety of the workforce and of Government inspectors is a critical element of the submittals. Submittals shall include safety information about guardrails, toe boards, and location of tie-offs for safety harnesses. Submittals shall be in accordance with Paragraph C.1.4. (SUBMITTALS) and Table 1A (LIST OF SUBMITTALS).

C.6.2. PAYMENT

Payment for furnishing, erecting, and relocating scaffolding system for the 25-foot and 30-foot diameter penstock sections will be made at the respective lump sum price bid therefor in the schedule, which price shall include the cost of all labor, equipment, and materials.

Payment for furnishing, erecting, and relocating scaffolding system for the 13-foot diameter penstock laterals (4 sections) will be made at the respective lump sum price bid therefor in the schedule, which price shall include the cost of all labor, equipment, and materials.

The cost of designs, drawings, submittals, furnishing, erecting, relocating, and final dismantling and removal of the scaffolding systems upon completion of the work shall be included in the applicable lump sum prices bid in the schedule for furnishing, erecting, and relocating scaffolding systems.

Payment for the two items for furnishing, erecting, and relocating scaffolding systems shall be made as follows:

a. When a scaffolding system has been completely installed to the Government's satisfaction, payment shall be made in the next regularly scheduled invoice for one-third of the amount bid for the applicable schedule item.

b. Payment shall be made in the next regularly scheduled invoices up to one-third of the amount bid for the applicable schedule item as satisfactory work progresses on the repair of painted surfaces of the penstock.

c. Payment shall be made in the next regularly scheduled invoice for one-third of the amount bid for the applicable schedule item upon satisfactory completion of the repair of painted surfaces of the penstock, removal of all material and equipment from the penstock, and cleanup of the penstock.

SUBSECTION C.7 - PAINTING

C.7.1. PAINTING AND COATING, GENERAL

a. General.--The Contractor shall submit all purchase orders and certifications; furnish all materials; prepare all surfaces; and apply the approved paint and protective coatings in accordance with this paragraph and paragraph C.7.2. (PAINTING TABULATION).

The Contractor shall furnish the standard warranty for their workmanship and the manufacturer's standard commercial warranty for the paint and coating, both of which are understood to be one year after application for the services, paint and coating furnished under the contract. The written warranties shall be submitted prior to submission of a final invoice. The written warranties shall contain, as a minimum, the items covered, warranty provisions, the effective date, and overall duration of the warranty, and shall be submitted in accordance with this paragraph and Paragraph C.1.4. (SUBMITTAL REQUIREMENTS).

The Contractor shall allow the Government to use the scaffolding for marking the damaged areas. Unless otherwise directed by the Contracting Officer, the Contractor shall complete all the required work in the area of the scaffolding for a given length and the full circumference of the pipe. The repair work shall start at the upstream end of the pipe and proceed downstream.

The Contractor shall be responsible for the safe and legal conduct of surface preparation and removing existing coatings, coating application, and disposal of excess coatings materials and removed coatings. All such activities shall be in accordance with applicable Federal, state, and local laws, rules, regulations, codes, and requirements and with these specifications.

(1) Protection of adjacent surfaces and equipment.--Items or surfaces not required to be painted or coated, but which are adjacent to surfaces to be prepared and coated, shall be protected against contamination and damage during the surface preparation and coating operations. This includes surfaces and equipment which are subject to contact by airborne contaminants as well as those which are in physical contact with the areas being prepared or coated. A coating film shall be considered dry through when it cannot be distorted or removed by exerting substantial, but less than maximum, pressure with the thumb and turning the thumb through 90° in the plane of the coating film.

(2) Damage caused by the Contractor.--Any items or surfaces which are in the Contracting Officer's opinion damaged or contaminated by the Contractor's operations shall be returned to their original condition by and at the expense of the Contractor. Before topcoating any coated surfaces, the Contractor shall clean any exposed surfaces and apply coating material as necessary to restore damaged or defective surfaces to the specified condition. Manufacturer-coated equipment shall be restored to the original appearance of the equipment by appropriate methods.

(3) Safety and health.--The Contractor shall develop, for this phase of work, a safety and health plan to include exposure monitoring, ventilation requirements, respirator use, work practices, lighting, and the necessary safety equipment for the protection of the workmen; and shall comply with all other applicable safety requirements during painting and coating operations. The Contractor shall submit in writing a proposed safety program in the form and time intervals prescribed in Section 2 of Reclamation's publication "Reclamation Safety and Health Standards".

All applicable Federal, state, and local requirements, and the manufacturer's recommended safety and health procedures, shall be followed when applying all coatings.

The Contractor's Safety Plan shall be tailored in accordance with county, state, and Federal regulatory guidelines. The Contractor shall be familiar with the additional sections of the Code of Federal Regulations (CFR) applicable to the services required by the Bureau of Reclamation for the Hoover Dam facilities as follows:

29 CFR 1910.34 - Respiratory Protection

29 CFR 1910.38 - Employee Emergency Plans and Fire Prevention Plans

29 CFR 1910.1000 - Toxic and Hazardous Substances - Air Contaminants, Permissible Exposure Limits (PEL’s)

29 CFR 1910.1020 -Employee Access to Exposure and Medical Records.

29 CFR 1926.55 - Gases, Vapors, Fumes, Dusts, and Mists

29 CFR 1926.59 - Hazard Communication

29 CFR 1926.103 - Respiratory Protection

40 CFR 261 - Identification and Listing of Hazardous Waste

40 CFR 262 - Standards Applicable to Generators of Hazardous Waste

40 CFR 263 - Standards Applicable to Transporters of Hazardous Waste

40 CFR 264 - Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities

In case of conflict between reference standards listed above, the more stringent requirement will apply.

b. Paint and coating materials approval.--

(1) General.--Prior to use or application of materials, the Contractor shall submit to the Government, for approval, copies of certifications of all coatings and related materials, as specified herein. However, acceptance of the material under the contract clause entitled "Inspection of Services," will not be made until the material has been satisfactorily applied at the jobsite.

(2) Submittals.--The Contractor shall furnish complete submittals of paint and coating materials no later than 30 days after the date of the executed contract.

Required certifications, three copies of all MSDS and related data required in Paragraph C.4.1. (SUBMISSION OF MATERIAL SAFETY DATA SHEETS FOR HAZARDOUS MATERIALS), and other submittals shall be submitted in accordance with this paragraph and Paragraph C.1.4. (SUBMITTAL REQUIREMENTS).

The Government will notify the Contractor whether the materials are approved or not approved no later than 20 days from the receipt of the submittals.

(a) Certification.--Manufacturer's certification shall be furnished for all coatings and related materials, except thinners, for each type, batch, lot, and color of material.

The certification shall state that the material is of the same composition as material which previously has been found to comply with these specifications when tested completely, or that the material complies with these specifications based on complete tests which the manufacturer has conducted on the particular batch or lot.

In addition, when the Contractor proposes to use an "or equal" material for any material which is specified by use of a "brand name or equal" purchase description and salient characteristics, submittals shall be in accordance with the requirements above and the requirements of paragraph C.2.2. (Reference Specifications and Standards) and shall include the following:

(aa) Product data sheet.

(bb) Application data sheet.

(cc) Certifications.

(dd) Certified test reports.

(b) Qualification of coating applicators.--Each coating applicator shall be skilled and experienced in the application of each coating material which they will apply under this contract. The Contractor shall submit written evidence that it successfully meets the requirements of the Society of Protective Coatings (SSPC) QP1 certification no later than 30 calendar days after contract award. Note: The Society of Protective Coatings (SSPC) was formerly known as the Structural Steel Painting Council (SSPC).

To obtain the SSPC QP1 certification, the Contractor must demonstrate competence in the following:

1) Safety

2) Quality Control

3) Technical Capabilities

4) Management

c. Materials.--Materials shall be in accordance with these specifications and the specifications listed in the painting tabulations in Paragraph C.7.2. (PAINTING TABULATION). All pigmented coatings and primers shall be purchased in containers not larger than 5 gallons as packaged by the manufacturer unless the Contractor is equipped at the coating site to handle and thoroughly mix coatings which are delivered in larger containers. Containers shall be labeled with the material specification number and the batch number.

d. Preparation of surfaces.--Surface preparation of the metalwork shall be in accordance with the methods specified herein and as indicated in the painting tabulation. Any coatings not required by and not shown in the painting tabulation shall be removed from the surfaces by suitable and effective means, unless otherwise directed. Surfaces include those with sound but weathered coatings; deteriorated and disbonded coatings; rusted galvanized and ferrous metal; and deposits of grease, oil, and other foreign materials. Surface preparation methods employed shall create suitable surfaces for subsequent coating and shall consist of methods specified below.

Prior to surface preparation, oil and grease, if any, shall be removed from surfaces to be painted or coated by the use of clean solvent and clean, lint-free wiping material. Cleaning solvent shall be a material which does not leave a residue, such as xylene. Cleaning cloths and solvents shall be discarded before they become contaminated to the extent that a greasy film would remain on the surface being cleaned.

All applicable environmental and safety regulations shall be observed in handling the solvents and disposing of the cleaning cloths and excess solvents.

Thereafter, the surfaces shall be prepared as follows:

(1) Specific surface preparation. --Specific surface preparation shall be by one of the following methods, as specified for each item in the coating tabulation:

(a) Method B-2. - Following the initial surface preparation and solvent cleaning, which would be obtained by method A, the surfaces shall be cleaned of all defective or damaged areas of existing paint or coating, and of all loose rust, loose mill scale, and other foreign substances by scraping, chipping, wire brushing, spot abrasive blasting, or other effective means to achieve SSPC (1995)-VIS 3 standard surface preparation SP11 or SP3/NG. Spot abrasive blasting shall conform to NACE No. 3-1994 or SSPC-SP6, commercial grade abrasive blasting. Feather the edges of existing sound coating surrounding the spot-cleaned areas to remove any abrupt edges. Roughen the surface of the feathered coating to achieve a matted or lusterless finish by brush blasting. In situations where brush blasting is undesirable due to brittle coatings or impractical, use SSPC-VIS 3 standard, either E-SP3/NG or E-SP3/SD.

(b) Method B-4. - Following the initial surface preparation and solvent cleaning, which would be obtained by method A, the surfaces shall be cleaned of all defective or damaged areas of existing paint or coating, and of all loose rust, loose mill scale, and other foreign substances by a sanding disk or grinder to achieve SSPC-VIS 3 standard surface preparation SP3/SD. Feather the edges of existing sound coating surrounding the spot-cleaned areas to remove any abrupt edges. Roughen the surface of the feathered coating to achieve a matted or lusterless finish.

(c) Method C-1. - Following the initial solvent cleaning, the defective or damaged areas of existing paint or coating, and of all loose rust, loose mill scale, and other foreign substances on ferrous surfaces shall be spot blast-cleaned to base metal, using dry, hard, sharp, blasting media, to produce a near-white, abrasive-blasted surface free of all foreign substances to achieve the specified or recommended surface profile. The surface shall be cleaned to equal or exceed NACE No. 2-1994 or SSPC-SP10. In situations where abrasive blasting is undesirable or impractical, "Power Tool Cleaning to Bare Metal," SSPC-SP11, may be used. Feather the edges of existing sound coating surrounding the spot-cleaned areas to remove any abrupt edges. Roughen the surface of the feathered coating to achieve a matted or lusterless finish by brush blasting, SSPC-SP7. In situations where brush blasting is undesirable due to brittle coatings or impractical, use SSPC-VIS 3 standard, either E-SP3/NG or E-SP3/SD.

e. Application. -

(1) Qualified applicators. - Coatings shall be applied only by applicators whose qualifications have been submitted and approved in accordance with subparagraph b. above.

(2) General material preparation and application. - Materials shall be thoroughly mixed at the time of application, and shall be clean and free from moisture.

Methods of preparing and applying paints and coatings not included in these specifications shall be in accordance with the manufacturer's instructions and the general requirements of these specifications.

Thinning of coatings to facilitate satisfactory application shall be kept to a minimum, but in no event shall it exceed 1 pint per gallon of coating, except as otherwise specified. Only thinner approved for the type of coating shall be used.

Where abrasive blasting is specified, the profile to be achieved is the one recommended by the coatings manufacturer(s). The majority of immersion coatings would typically require a profile of 2 to 3 mils. If a specific profile has not been specified in this specification, the specific profile shall be obtained from the coatings manufacturer(s).

(3) Environmental temperatures and humidities. - The application of individual coating systems shall be applied within the specificized maximum and minimum curing temperatures and between the maximum and minimum relative humidity applicable to that coating system. The temperature and humidity limits shall be as defined on the coating category sheets or the product data sheets, whichever is more restrictive. Except as otherwise specified, coatings shall not be applied when the surface temperature of the item to be coated or the surrounding air temperature is under 45 °F. As required, to control the air temperature and relative humidity of the air surrounding the coated items, dehumidification equipment may be required.

For metalwork items that are being coated by single-component, moisture-cure urethanes, the surfaces shall not have any free moisture on the surface. Coating shall proceed only when the humidity and the temperatures of atmosphere and of surfaces to be coated are such that evaporation rather than condensation will result. However, the coating may be applied when the surface is saturated, surface dry.

Recoating times at a reference temperature are given in the "physical characteristics" section of the categories or in the specifications referred to in the categories. Some categories show both a minimum and maximum recoating time (a "window"). Others show only the minimum recoating time. When applying and curing coatings at different

temperatures, the cure time will also vary and shall be accounted for. Federal Specification coatings shall be checked for recoating times. If recoating times are not listed in the categories or in the Federal Specification, the Contractor shall consult the coatings manufacturer for the recoating time.

As determined by the Contracting Officer, if necessary to improve application properties, cold-applied coatings shall be heated by means of a hot-water bath, or other OSHA-approved method, to temperatures not exceeding 100 °F.

(4) Method of application.--Unless otherwise specified, priming (first) coats shall be applied using the following method:

All boltheads, welds, edges, corners, and similar items shall be primed by brushing to thoroughly and effectively coat these difficult areas. The coating material may be delivered to the surface by spraying and then "scrubbed in" by brushing. If a thorough blowdown, vacuuming, or other dry means of cleaning the blasted surface has adequately removed remaining blasting debris, flat areas (without difficult areas) may be coated by spraying.

Care shall be exercised during spray application to hold the nozzle sufficiently close to the surfaces being painted to produce a continuous wet coat, and to avoid excessive evaporation of the volatile constituents and loss of material into the air, or bridging over crevices and corners. Effective means shall be provided for removing free oil and moisture from the air-supply lines of all spraying equipment. Spray equipment shall be equipped with pressure gauges, and pressure regulators. Spray equipment shall also be equipped with mechanical agitators, except when specific coating systems, i.e. single-component, moisture-cure urethanes require that mechanical agitators not be used. Nozzle pressure consistent with acceptable finish results shall be employed when spray coating.

Each coat shall be applied in such a manner as to produce an even film of uniform thickness which will completely cover irregularities, fill crevices, and be tightly bonded to the substrate or previous coat. When registers and grilles are being coated, care shall be taken not to clog openings or otherwise excessively coat the surfaces. Each coat shall be free from runs, pinholes, sags, laps, brush marks, voids, and other defects. Each coat shall be allowed to dry or to harden before the succeeding coat is applied.

Brush coats may be applied by the conventional brushing procedure, or the coating may be delivered to the surface in a fluid stream by means of spray equipment and the coating then spread immediately by brushing to a smooth, uniform coating.

(5) Material thickness, continuity, and verification.--The thickness on steel surfaces shall be measured by approved gauges and shall be not less than the minimum specified thickness at any point on the coating. Acceptance will be based on specified coverages, or on the specified total dry-film thickness (DFT) as measured by an Elcometer, Mikrotest, or other suitable DFT gauge, after the complete coating system has hardened, but before the recoating interval has been exceeded. Unless otherwise specified, the DFT is measured above any created profile on the surface, i.e., above the peaks, not the valleys, of the profile.

Nonconductive coating applied to conductive base metals which will be buried or completely or partially submerged in water shall be tested for pinholes and holidays, using the following types of holiday detectors:

(a) For lacquer-type coatings, such as vinyls, a low-voltage wet sponge holiday detector shall be used. Unless otherwise directed by the Contracting Officer, this same type of holiday detector shall be used on other types of coatings with a DFT of less than 16 mils. No detergent shall be used when making the pinhole and holiday determination with a low-voltage wet sponge holiday detector.

(b) For all coatings between 16 and 20-mil DFT, such as coal-tar epoxies with a DFT of 16 mils or more, and other high-performance coatings (except lacquer types) with DFTs of 16 mils or more, a variable voltage holiday detector shall be used unless otherwise directed by the Contracting Officer. If the use of a low-voltage wet sponge holiday detector is directed, no detergent shall be used.

(c) Variable voltage holiday detectors shall be adjusted to provide 100 volts per mil of DFT.

Minimum and maximum times for holiday detection and repair of pinholes and holidays shall be in accordance with the coating manufacturer's recommendations and these specifications. The Contractor shall notify the Government 72 hours in advance of holiday testing so that the Government may witness the pinhole and holiday testing.

(6) Volatile organic compound (VOC) content of all specified coatings systems shall not exceed the maximum VOC content permitted by Federal, State, and local air pollution control regulations. VOC content for each coating or coating system is listed in the coating category and is identified as either "as supplied" or "reduced for spray." If the actual VOC levels of a coating or coating system specified either in the tabulations or coating categories, exceeds the maximum allowed by air pollution control regulations either at the point of application or at the construction site, that coating tabulation option may not be used, even if that option is listed in a coating tabulation. It is the application ("reduced for spray") VOC, not the "as supplied" VOC, which shall not exceed the

maximum allowed by the air pollution control regulations. If in doubt as to how much VOC will be increased by various levels of thinning, the Contractor shall consult with the coatings manufacturer.

(7) Application of specific materials shall be as follows:

(a) Single-component, moisture-curing urethane.--Application shall be in accordance with the manufacturer's recommendations. During coating application, do not exceed the maximum DFT or wet film thickness per coat listed in either the coating categories or coating tabulation. When applying the zinc-rich urethane primers, it is better to have the applied coating thickness be closer to the minimum DFT, rather than toward the maximum DFT when applying the coating at elevated temperatures, greater than 90 °F, and or higher humidities, greater than 90 percent.

These urethanes react with atmospheric moisture. The applicator shall limit the time partially filled containers are open to the atmosphere before being resealed. Only open the new containers when ready to apply the coating. Do not open and then agitate or box mix the coating when the atmospheric or material temperatures are less than 5 °F above the dewpoint temperature. If the remaining coating in an open or resealed, partially full container will not be applied within 2 hours ± 1 hour, a 4 ounce per 5 gallon container, "float" of manufacturer-approved thinner shall be "floated" on the surface of the remaining coating in the container. Only manufacturer-approved thinners shall be used. Other thinners may contain small quantities of moisture, alcohol, or other hydroxyl bearing solvents, which can destroy the moisture-cure reaction either partially or completely without any outward change in appearance, color, viscosity, or gelling.

When using spray application equipment, do not continue to mechanically agitate the coating after the initial mixing.

f. Cost. - The cost of furnishing and applying paints and coatings shall be included in the applicable prices bid in the schedule for the items of work which require painting or coating.

C.7.2. COATING TABULATIONS AND CATEGORIES

a. General. - Items shall receive the cleaning, painting, and coating systems shown in the tabulations below. Paint and coatings shall be applied in accordance with Paragraph C.7.1 (PAINTING AND COATING, GENERAL).

All components of a coating system shall be obtained from and guaranteed by the same manufacturer. Unless otherwise specified, water-borne and solvent-borne coatings shall not be

used together. For example, a waterborne primer shall not be used with a solvent borne topcoat; however, when specified, a solvent borne primer can be topcoated with a waterborne coating.

In the tabulations under the column headed "Paint or Coating Material," materials may be specified by either reference to voluntary standards, Federal Specifications or Standards, "Brand-name or equal" purchase descriptions, or by reference to coatings categories. The coating categories identify a specific coating or coating system and specify the salient coating characteristics and coating performance requirements which shall be met under these specifications. The coating color for intermediate coats may be varied to aid the coating applicator in the uniform and complete application of the material.

b. Coatings categories, general. -

(1) Each coating category is subdivided into four sections:

(a) Category.--An alphanumeric label associated with either a specific coating product or products, Federal or Military coating specifications, or class of coating systems, i.e. tape wrap. For a specific commercial product, the name, address, and telephone number of material manufacturer/supplier will be given.

(b) Composition.--A generic chemical identification of the coating material.

(c) Physical characteristics.--The salient properties of the material, such as volume of solids, VOC level, minimum curing temperature, pot life, the component mix ratio of a multi-component material, etc.

(d) Performance requirements.--Generally a series of ASTM Testing protocol with prescribed maximum and/or minimum requirements that shall be met by the specified coating or proposed coating material, unless otherwise modified by the Government.

Within the physical characteristics section of the Coating Category, the general methods of application are listed as well as any restrictions. Generally within Federal and Military specifications, coating application methods are also given. If, however, specific "Application Methods", or restrictions are not listed, and general practice does not indicate what "Application Method" can be used, consult the specific coating manufacturer. If specific restrictions are listed, i.e. shop application only, or use only plural component, airless spray equipment, these restrictions shall be followed.

(2) Coating category descriptions.--There are four main classes of coatings used on Reclamation's infrastructures. The coatings are classified by the coating's life cycle exposure condition. The four exposure conditions are:

(a) Immersion (IE).

(b) Burial in soil (BE).

(c) Atmospheric or non-immersion exposure (AE).

(d) General exposure (GE) of non-ferrous materials to any of the above environments.

Coatings suitable for one exposure condition may or may not be suitable for other exposure conditions.

(3) Coating category alphanumeric designation.--The coating category alphanumeric labels found in the coating tabulations and coating categories are Government abbreviations. The abbreviations use up to eight characters per label, and are used to link different coatings into groups. The alphanumeric labels are divided into two parts, a coating exposure class and several subclasses.

c. Coating tabulations.--The coating tabulations identify and specify the coatings to be used. Each tabulation lists the items and surfaces to be coated, and specifies the coating or coating options, number and thickness of coats to be applied, surface preparation method to be used before applying the coatings, and the surface profile if different from general conditions. Within some coating options there are several different coating categories listed. Only one Contractor-selected coating category shall be applied per option and individual system coats shall be compatible with the other applied coats, either primer, intermediate, or topcoat.

Tabulation No. 1. -

Items to be painted or coated:

a. Isolated spot repair of damaged areas on the interior surface of the 25' and 30' diameter sections of the penstock. Damaged areas are located randomly throughout the penstock and may range in size from 1 to 30 square feet for an approximate quantity of 2000 square feet.

b. Isolated spot repair of damaged areas on the interior surface of the 13' diameter penstock laterals. Damaged areas are located randomly throughout the four penstock laterals and may range in size from 1 to 30 square feet for an approximate quantity of 500 square feet.

Paint or coating materials, option 1	Number and thickness of coats	Surface preparation method
Category: IES-2H Finish color shall be manufacturer's standard black.	1 spot prime coat to produce a DFT between 3 to 4 mils per coat over the steel substrate and existing feathered coating.	C-1 On succeeding coats follow the manufacturer's specific application instructions and/or specifications for surface preparation.
	1 or more intermediate coats, to produce a minimum DFT between 5 to 7 mils per coat	
	1 or more topcoats, to produce a minimum DFT between 5 to 7 mils per coat. For a minimum total DFT of 15 mils over the spot prime and feathered existing coating.	

Paint or coating materials, option 2	Number and thickness of coats	Surface preparation method
Category: IES-2G Finish color shall be manufacturer's standard black.	1 spot prime coat to produce a DFT between 3 to 4 mils per coat over the steel substrate and existing feathered coating.	B-4 On succeeding coats follow the manufacturer's specific application instructions and/or specifications for surface preparation.
	1 or more intermediate coats, to produce a minimum DFT of between 5 to 7 mils per coat.	
	1 or more topcoats, to produce a minimum DFT between 5 to 7 mils per coat. For a minimum total DFT of 15 mils over the spot prime and feathered existing coating.	

Tabulation No. 1. -

Paint or coating materials, option 3		Number and thickness of coats	Surface preparation method
Category:	IES-2E Finish color shall be manufacturer's standard black.	1 spot prime coat to produce a DFT between 5 to 7 mils per coat over the steel substrate and existing feathered coating.	B-2 On succeeding coats follow the manufacturer's specific application instructions and/or specifications for surface preparation.
		1 or more intermediate coats, to produce a DFT between 5 to 7 mils per coat	
		1 or more topcoats, to produce a minimum DFT between 5 to 7 mils per coat. For a minimum total DFT of 15 mils over the spot prime and feathered existing coating.	

d. Specific coating categories.--The specific coating categories referenced in the coating tabulations above, by an alphanumeric name, are listed below. These coating categories identify either the product name and manufacturer with their address and telephone number specified for use in this specifications. The performance requirements of an "or equal" product for specific coating categories are included.

Category IES-2E

Category IES-2E coating system shall be MC-Tar, as manufactured by:

Wasser High-Tech Coatings
8401 S. 228th, Building. 103
Kent WA 98032
(206) 850-2967,

or equal, having the following salient characteristics:

COMPOSITION:

Self-priming, aromatic, single-component, moisture-cure, urethane, refined tar - pigmented with micaceous iron oxide (MIO)* at a minimum loading of 3.5 pounds per gallon

Lead and chromate free

PHYSICAL CHARACTERISTICS:

Volume solids:	59 percent, minimum
Weight per gallon	13.0 ± 0.5 pounds per gallon
VOC (as supplied):	2.8 pounds per gallon (335 grams per liter), maximum
Minimum application temperature:	20 °F (Inspector must approve application below 33 °F)
Maximum applied DFT per coat:	7 mils dry, 12 mils wet
Curing time at 75 °F and 60% RH:	Touch - 20 minutes; Handle - 8 hours; Stack - 12 hours
Recoating time at 50 to 90 °F and 60% RH**:	4 hours, minimum; no maximum
Application method:	Brush, roller, conventional, or airless spray
Time before immersion after final coat has been applied at 40 to 90 °F and greater than 30 percent RH:	8 hours, minimum (special immersion situations may be permitted after 1 hour)

COATING SYSTEM PERFORMANCE REQUIREMENTS:

Fresh/Deionized water immersion test: (ASTM D 870-92)	passes 3,000 hour test with aerated water held at ambient temperatures with no blisters evident on either the scribed or unscribed sides.

Category IES-2E

Salt water immersion test: (ASTM D 870-92, ASTM D 1141-92 formula A with no heavy metals)	passes 3,000 hour test with aerated water held at ambient temperatures with no blisters evident on either the scribed or unscribed sides.
QUV Accelerated weathering test (ASTM D 4587-91, ASTM G 53-96)	passes 3,000 hour test with no blisters evident on either the scribed or unscribed sides, minimal chalking (ASTM D 4214-89) or color difference (ASTM D 2244-93).
Cathodic disbondment: (Applicable tests includes but are not limited to: ASTM G 8-96, ASTM G 42-96, ASTM G 95-92)	Has passed a recognized standard cathodic disbondment test.
Direct impact resistance (ASTM D 2794-93A):	greater than 150 inch pounds
Flexibility (ASTM D 522-93A, 180° bend over 1-inch mandrel):	passes
Pencil hardness (ASTM D 3363-92):	2B, minimum
Pulloff Adhesion (ASTM D 4541-95) w/(Elcometer):	greater than 500 psi
Tape adhesion (ASTM D 3359-95A):	equal to or better than 4A

* Note: All MIO products shall conform to ASTM D 5532-94, Type 1, at 80 percent minimum lamellarity, 85 percent minimum Fe_2O_3 content, with the non-MIO crystalline content comprised of quartz, mica, feldspaths, barytine, and shall be free of sulfates, carbonates and chlorine with soluble salts below 0.04 percent, and have Certificate of Conformance from MIO source with current batch numbers and dates.

** Additional recoat time is required at temperatures of 20 to 40 °F and humidities of 10 to 30%.

Category IES-2G

Category IES-2G coating system shall be MC-Miozinc, spot primer; MC-Tar, primer/intermediate/topcoat; as manufactured by:

Wasser High-Tech Coatings
8401 S. 228th, Building. 103
Kent WA 98032
(206) 850-2967,

or equal, having the following salient characteristics:

COMPOSITION:

Spot Primer - Aromatic, single-component, moisture cure urethane - zinc and micaceous iron oxide pigmented (MIO)*

Full Primer/Intermediate/Topcoats - Aromatic, single component, moisture-cure, urethane, refined tar - pigmented with micaceous iron oxide (MIO)* at a minimum loading of 3.5 pounds per gallon

Lead and chromate free

PHYSICAL CHARACTERISTICS, SPOT PRIMER:

Volume solids:	59 percent, minimum
Weight per gallon:	20.2 ± 0.6 pounds per gallon
VOC (as supplied):	2.8 pounds per gallon (335 grams per liter), maximum
Minimum application temperature:	20 °F (Inspector must approve application below 33 °F)
Maximum applied DFT per coat:	4 mils
Curing time at 75 °F and 60% RH:	Touch - 20 minutes; Handle - 8 hours; Stack -12 hours
Recoating time at 50 to 90 °F and 60% RH**:	4 hours, minimum; no maximum
Application method:	Brush, roller, conventional, or airless spray

PHYSICAL CHARACTERISTICS, PRIMER/INTERMEDIATE/TOPCOATS:

Volume solids:	62 percent, minimum
Weight per gallon:	13.0 ± 0.5 pounds per gallon

Category IES-2G

VOC (as supplied):	2.8 pounds per gallon (335 grams per liter), maximum
Minimum application temperature:	20 °F (Inspector must approve application below 33 °F)
Maximum applied DFT per coat:	7 mils
Curing time at 75 °F and 60% RH:	Touch - 20 minutes; Handle - 8 hours; Stack - 12 hours
Recoating time at 50 to 90 °F and 60% RH**:	4 hours, minimum; no maximum
Application method:	Brush, roller, conventional or airless spray
Time before immersion after final coat has been applied at 40 to 90 °F and greater than 30 percent RH:	8 hours, minimum (special immersion situations may be permitted after 1 hour)

COATING SYSTEM PERFORMANCE REQUIREMENTS:

Fresh/Deionized water immersion test: (ASTM D 870-92)	passes 3,000 hour test with aerated water held at ambient temperatures with no blisters evident on either the scribed or unscribed sides.
Salt water immersion test: (ASTM D 870-92, ASTM D 1141-92 formula A with no heavy metals)	passes 3,000 hour test with aerated water held at ambient temperatures with no blisters evident on either the scribed or unscribed sides.
QUV Accelerated weathering test (ASTM D 4587-91, ASTM G 53-96)	passes 3,000 hour test with no blisters evident on either the scribed or unscribed sides, minimal chalking (ASTM D 4214-89) or color difference (ASTM D 2244-93).
Direct impact resistance (ASTM D 2794-93A):	greater than 150 inch pounds
Flexibility (ASTM D 522-93A, 180° bend over ½-inch mandrel):	passes
Pencil hardness (ASTM D 3363-92):	2B, minimum
Pulloff Adhesion (ASTM D 4541-95) (Elcometer)	greater than 500 psi
Tape adhesion (ASTM D 3359-95A):	equal to or better than 4A

Category IES-2G

Cathodic disbondment: (Applicable tests includes but are not limited to: ASTM G 8-96, ASTM G 42-96, ASTM G 95-82)	Has passed a recognized standard cathodic disbondment test.

* Note: All MIO products shall conform to ASTM D 5532-94, Type 1, at 80 percent minimum lamellarity, 85 percent minimum Fe_2O_3 content, with the non-MIO crystalline content comprised of quartz, mica, feldspaths, barytine, and shall be free of sulfates, carbonates and chlorine with soluble salts below 0.04 percent, and have Certificate of Conformance from MIO source with current batch numbers and dates.

** Additional recoat time is required at temperatures of 20 to 40 °F and humidities of 10 to 30%.

Category IES-2H

Category IES-2H coating system shall be MC-Zinc, spot prime; MC-Tar, topcoat; as manufactured by:

Wasser High-Tech Coatings
8401 S. 228th, Building. 103
Kent WA 98032
(206) 850-2967,

or equal, having the following salient characteristics:

COMPOSITION:

Spot Primer - Aromatic, single component, moisture-cure, urethane - zinc pigmented containing a minimum of 83 percent, by weight, of zinc in dry film.

Full Primer/Intermediate/Topcoats - Aromatic, single component, moisture-cure, urethane, refined tar - pigmented with micaceous iron oxide (MIO)* at a minimum loading of 3.5 pounds per gallon

Lead and chromate free

PHYSICAL CHARACTERISTICS, SPOT PRIMER:

Volume solids:	60 percent, minimum
Weight Solids:	87 percent, minimum
Weight per gallon	23 pounds per gallon, minimum
Pigment type:	83 percent, minimum zinc dust in dry film, yielding a minimum of 0.050 lbs/ft^2 zinc by weight in dry film (at 3 mil DFT)
VOC (as supplied):	2.8 pounds per gallon (335 grams per liter), maximum
Minimum application temperature:	20 °F (Inspector must approve application below 33 °F and RH below 35 percent)
Maximum applied DFT per coat:	3.5 mils dry, 6 mils wet
Curing time at 75 °F; applied DFT of 3 mils and 60% RH:	Touch - 20 min: Handle - 8 hrs: Recoat - 4 hrs: Stack - 10 hrs
Recoating time at 40 °F and 60 to 90 percent RH:	6 hours, minimum (allow more time at RH of 10-30 percent and temperatures of 20-40 °F); no maximum

Category IES-2H

Recoating time at 50 to 100 °F and 60 to 90 percent RH:	4 to 6 hours, minimum (allow more time at RH of 10-30 percent); no maximum
Application method:	Brush, roller, conventional or airless spray

PHYSICAL CHARACTERISTICS, PRIMER/INTERMEDIATE/TOPCOATS:

Volume solids:	59 percent, minimum
Weight per gallon:	13.0 ± 0.5 pounds per gallon
VOC (as supplied):	2.8 pounds per gallon (335 grams per liter), maximum
Minimum application temperature:	20 °F (Inspector must approve application below 33 °F)
Maximum applied DFT per coat:	10 mils
Curing time at 75 °F and 60% RH:	Touch - 20 minutes; Handle - 8 hours; Stack - 12 hours
Recoating time at 50 to 90 °F and 60% RH**:	4 hours, minimum; no maximum
Application method:	Brush, roller, conventional, or airless spray
Time before immersion after final coat has been applied at 40 to 90 °F and greater than 30 percent RH:	8 hours, minimum (special immersion situations may be permitted after 1 hour)

COATING SYSTEM PERFORMANCE REQUIREMENTS:

Fresh/Deionized water immersion test: (ASTM D 870-92)	passes 3,000 hour test with aerated water held at ambient temperatures with no blisters evident on either the scribed or unscribed sides.
Salt water immersion test: (ASTM D 870-92, ASTM D 1141-92 formula A with no heavy metals)	passes 3,000 hour test with aerated water held at ambient temperatures with no blisters evident on either the scribed or unscribed sides.
QUV Accelerated weathering test (ASTM D 4587-91, ASTM G 53-96)	passes 3,000 hour test with no blisters evident on either the scribed or unscribed sides, minimal chalking (ASTM D 4214-89) or color difference (ASTM D 2244-93).
Direct impact resistance (ASTM D 2794-93A):	greater than 150 inch pounds

Category IES-2H

Flexibility (ASTM D 522-93A , 180° bend over 1/2-inch mandrel):	passes
Pencil hardness (ASTM D 3363-92):	2B, minimum
Pulloff Adhesion (ASTM D 4541-95) (Elcometer)	greater than 500 psi
Tape adhesion (ASTM D 3359-95A)	equal to or better than 4A
Cathodic disbondment: (Applicable tests includes but are not limited to: ASTM G 8-96, ASTM G 42-96, ASTM G 95-82)	Has passed a recognized standard cathodic disbondment test.

* Note: All MIO products shall conform to ASTM D5532-94, Type 1, at 80 percent minimum lamellarity, 85 percent minimum Fe_2O_3 content, with the non-MIO crystalline content comprised of quartz, mica, feldspaths, barytine, and shall be free of sulfates, carbonates and chlorine with soluble salts below 0.04 percent, and have Certificate of Conformance from MIO source with current batch numbers and dates.

** Additional recoat time is required at temperatures of 20 to 40 °F and humidities of 10 to 30%.

C.7.3. PAYMENT

Payment for surface preparation and painting of isolated damaged areas (spot repair) on the interior surfaces of the penstock and penstock laterals with aromatic, single-component, moisture-cure, urethane, refined tar - pigmented with micaceous iron oxide will be made at the respective unit prices bid therefor in the schedule, which prices shall include the cost of all labor, equipment, and materials. Surface preparation includes media-blasting to bare metal for complete removal of existing coal tar coating material in the damaged areas and feathering back existing material to allow adequate bonding. The work area shall be treated as a confined space and shall require air monitoring, air purification with filters as warranted by the air monitoring, and worker safety and health monitoring.

The cost for collection, containment, and disposal of hazardous waste generated during the media blasting operations shall be included in the applicable prices bid in the schedule for work that requires removal of coal tar coating and/or coal tar enamels.

SUBSECTION C.8 - DRAWINGS

C.8.1. DRAWINGS, GENERAL

a. General.--The drawings which form a part of these specifications are the original piping installation drawings. The Government has attempted to verify the accuracy of these drawings, however it is the Contractor's responsibility to ensure the accuracy of details that affect the job. In the event there are minor differences as determined by the Contracting Officer between details and dimensions shown on the drawings and those of existing features at the site, the details and dimensions of existing features at the site shall govern.

b. Additional copies of drawings.--The Contractor will be furnished such additional copies of these specifications and drawings as may be required for carrying out the work. Full-size contact prints of the original drawings from which the attached reproductions were made. The number of prints of each drawing furnished to the Contractor will be limited to 2 sets of contact prints and 1 set of reproducibles.

c. Existing installation drawings.--The drawings included herein are existing installation drawings. These drawings are included to show the existing installations.

C.8.2. LIST OF DRAWINGS

The following drawings are made a part of these specifications:

REPAIR OF PAINTED SURFACES
LOWER ARIZONA PENSTOCK
BOULDER CANYON PROJECT
HOOVER DAM
ARIZONA-NEVADA

GENERAL

Sheet No.	Drawing No.	Title
1.	45-301-7189	Location Map
2.	45-301-7190	General Location Map

INFORMATION DRAWINGS

Sheet No.	Drawing No.	Title
3.	45-D-2246	Penstock and Outlet Tunnels – General Layout
4.	45-D-1943	Penstock and Outlet Tunnels – Lower Arizona
5.	45-D-2173	Plate Steel Outlet Pipes – 30' Dia. Headers-Penstock-Conduits in Lower Arizona Tunnel
6.	45-D-2539	Plate Steel Outlet Pipes – Tunnel Plug Outlet -General Layout
7.	45-301-5341	Hoover Penstocks – 25' Dia. Penstock Installation - 24" by 36" Manhole - Details-Section
8.	45-D-6291	30' Dia. Penstock – 16" by 20" Elliptical Manholes